claims 1, 8, and 26 have now been amended to substitute the phrase suggested by the Examiner: "a container containing a liquid phosphorous compound."

Claims 24-25 have been rejected under 35 U.S.C. §112 ¶2, and under 35 U.S.C. §112 ¶1, for referring to VESPEL® as a polyamide rather than as a polyimide. Accordingly, claims 24-25 and the specification have now been amended to recite a "polyimide" rather than a "polyamide". The specification has also been amended to ascribe KEL-F® to Du Pont.

3. Claim Rejections Under 35 U.S.C. §103(a)

Claims 1-12, 15-23, and 26-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima (EP 045088), Sivaramakrishnan (EP 0602595) and Siegele (US 5,607,002) in view of Lankford (The Making Shaping and Treating of Steel) or Maruhashi (4,594,114). This rejection is traversed as follows.

As a threshold matter, the Examiner is reminded that an obviousness rejection based upon a combination of references cannot be established without some teaching, suggestion or incentive to support combination of the references. ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F. 2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). Absent such a showing in the prior art, the Examiner cannot use the applicants' teaching to hunt through the prior art for the claimed elements and combine them as claimed. See In re Vaeck, 947 F. 2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991); In re Bond, 910 F. 2d 831, 15 USPQ 2d 1566 (Fed. Cir. 1990). The use of hindsight is never permissible to establish obviousness.

In the instant case, the Examiner's obviousness rejection may be summarized as follows:

> Nagashima, Sivaramakrishnan, and Siegle all teach the use of stainless steel as a material of construction of semiconductor processing apparatus of the type contemplated by applicants. They do not discuss the amount of nickel in their stainless steel. Langford and Maruhashi make clear that stainless steel having little or no nickel is common and well known as corrosion resistant material. It would have been prima facie obvious to one skilled in the art to use a low nickel stainless steel in the apparatus of Nagashima, Sivaramakrishnan and Siegele. . . . (Emphasis added; Office Action mailed 9/26/01, page 2, lines 11-17).

The references relied upon by the Examiner to issue the obviousness rejections fail to disclose any teaching, suggestion, or incentive for combining them to achieve the claimed

invention. As acknowledged by the Examiner, while Nagashima, Sivaramakrishnan and Siegele refer to the use of stainless steel in semiconductor processing equipment, these references do not discuss the nickel content of those steels.

Moreover, while the Lankford or Maruhashi references indicate that stainless steels having low nickel content may exhibit corrosion resistance, corrosion resistance was not the motivation for using low nickel steel in accordance with the present invention. Rather, low nickel stainless steel avoids the unwanted build up of residues:

> One problem encountered with such valves is the build-up of residue around the orifice, which can prevent proper seating of a cut-off plug to hinder control of the valve. Excessive build-up of residue can also block the orifice itself, or severely restrict the flow of liquid through the orifice. Residue build-up on other surfaces can contaminate subsequent gases flowing across the surface or contained in the container. (Emphasis added; page 1, lines 24-28).
> * * *
> The build-up of the residue which has been observed may be due to the nickel helping to decompose TEPO into phosphoric acid and ethanol. This can be avoided by limiting the amount of nickel in the alloy. (Emphasis added; page 5, lines 14-17).

To reiterate, none of the references relied upon by the Examiner teach or suggest the effect of Nickel on a liquid phosphorous precursor compound. None of the cited references makes the suggestion that reducing the nickel content of stainless steel used in an apparatus for handling such a precursor will have any beneficial effect. Based upon this lack of suggestion to combine the cited references, it is respectfully asserted that the claims are not obvious under 35 U.S.C. §103(a), and the Examiner's rejection should be withdrawn.

The Examiner has also rejected a number of the dependent claims as obvious based on the combination of additional references with those discussed above. Specifically, claims 13 and 14 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima, Sivaramakrishnan, and Siegele in view of Lankford or Maruhashi, further in view of Yamaguchi (US 5,520,858) and Stauffer (US 5,252,134). Claims 24 and 25 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Nagashima, Sivaramakrishnan, and Siegele in view of Lankford or Maruhashi, further in view of Aya (US 4,340,697, Carpenter (US 4,084,440), Goss (US 3,592,222), Benware (US 3,642,248) and/or King (US 4,368,755).

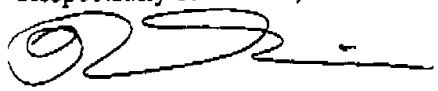
Again, it is respectfully asserted that the Examiner has impermissibly employed hindsight to assemble a chain of references reject these dependent claims. In light of the above discussion, and because Claims 13-14 and 24-25 are dependent claims reciting limitations of the independent claim and additional features therefor, applicants submit that claims 13-14 and 24-25 are not obvious and are allowable.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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VERSION SHOWING CHANGES MADE

In the Specification

Please revise the paragraph starting at page 2, line 20 to read as follows:

In another embodiment, a [polyamide] polyimide is used for a plug in an injection valve instead of prior art fluoropolymers. The [polyamide] polyimide, preferably [Vespel] VESPEL® (a Du Pont product) is used, and exhibits better tolerance to the liquid phosphorous precursor compound and heat. The [polyamide] polyimide can also be used for gaskets and seals.

Please revise the paragraph starting at page 4, line 18 to read as follows:

Plug 68 in existing valves is a compressible sealer typically made of [Kel-F] KEL-F® (a [3M] Du Pont fluoropolymer). We have found that [Kel-F] KEL-F® tends to swell up and break. Accordingly, another aspect of the present invention is the use of [Vespel] VESPEL® (DuPont [polyamide] polyimide resin) for the plug. [Vespel] VESPEL® can also be used for gaskets and seals in any system which utilizes a liquid phosphorous precursor compound.

At page 4, line 25, the term "Vespel" has been replaced with the term "VESPEL®".

In the Claims

1. (Three times Amended) An apparatus for use with a liquid phosphorous precursor compound comprising:

a container [comprising] containing a liquid phosphorous precursor compound;

a conduit; and

an orifice disposed between the liquid container and the conduit, wherein at least one of the liquid container, the orifice, and the conduit has a surface of a stainless steel alloy having less than about one percent (1%) nickel.

8. (Three times amended) An apparatus for delivering a liquid phosphorous precursor compound, comprising:

a container [comprising] containing a liquid phosphorous precursor compound;

a conduit configured to convey said liquid phosphorous precursor compound or a gaseous product of said liquid phosphorous precursor compound from the container;

a heating surface coupled to at least one of a portion of said container and a portion of said conduit;

wherein at least one of said portion of said container and said portion of said conduit is composed of a stainless steel alloy having less than about one percent (1%) nickel.

24. (Amended) The valve of claim 20 further comprising a plug in said valve composed of a [polyamide] polyimide.

25. (Amended) The valve of claim 24 wherein said [polyamide] polyimide is [Vespel] VESPEL®.

26. (Three times amended) A liquid injection system for a CVD chamber comprising:

a container [comprising] containing a liquid TEPO, TMP or TEP;

an injection valve for converting said liquid TEPO, TMP or TEP into gaseous form, said injection valve having portions in contact with said liquid TEPO, TMP or TEP composed of a stainless steel alloy having less than about one percent (1%) nickel and at least 15% chromium;

a liquid TEPO, TMP or TEP injection line coupling said container to said injection valve;

a carrier gas source line coupled to said injection valve; and

an outlet line coupling said injection valve to said CVD chamber.